BS EN ISO 4892-2:2013+A1:2021

BSI Standards Publication

Plastics — Methods of exposure to laboratory light sources

Part 2: Xenon-arc lamps

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This British Standard is the UK implementation of EN ISO 4892-2:2013+A1:2021. It is identical to ISO 4892-2:2013, incorporating amendment 1:2021. It supersedes BS EN ISO 4892-2:2013, which is withdrawn.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to ISO text carry the number of the ISO amendment. For example, text altered by ISO amendment 1 is indicated by A1 A1.

The UK participation in its preparation was entrusted to Technical Committee PRI/21, Testing of plastics.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2021

ISBN 978 0 539 15233 3

ICS 83.080.01

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2013.

Amendments/corrigenda issued since publication

Date	Text affected
31 August 2021	Implementation of ISO amendment 1:2021 with CEN endorsement A1:2021

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 4892-2:2013 +A1

August 2021

ICS 83.080.01

English Version

Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps (ISO 4892-2:2013)

Plastiques - Méthodes d'exposition à des sources lumineuses de laboratoire - Partie 2: Lampes à arc au xénon (ISO 4892-2:2013)

Kunststoffe - Künstliches Bestrahlen oder Bewittern in Geräten - Teil 2: Xenonbogenlampen (ISO 4892-2:2013)

This European Standard was approved by CEN on 9 February 2013.

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Ref. No. EN ISO 4892-2:2013+A1:2021: E

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European foreword

This document (EN ISO 4892-2:2013) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2013, and conflicting national standards shall be withdrawn at the latest by September 2013.

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The text of ISO 4892-2:2013 has been approved by CEN as EN ISO 4892-2:2013 without any modification.

Foreword to amendment A1

This document (EN ISO 4892-2:2013/A1:2021) has been prepared by Technical Committee ISO/TC 61 "Plastics" in collaboration with Technical Committee CEN/TC 249 “Plastics” the secretariat of which is held by NBN.

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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ISO 4892-2 was prepared by Technical Committee ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

This third edition cancels and replaces the second edition (ISO 4892-2:2006), which has been technically revised. It also cancels and replaces the Amendment ISO 4892-2:2006/Amd.1:2009.

ISO 4892 consists of the following parts, under the general title *Plastics — Methods of exposure to laboratory light sources*:

— *Part 1: General guidance*

— *Part 2: Xenon-arc lamps*

— *Part 3: Fluorescent UV lamps*

— *Part 4: Open-flame carbon-arc lamps*

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INTERNATIONAL STANDARD **ISO 4892-2:2013+A1:2021**

Plastics — Methods of exposure to laboratory light sources —

Part 2: Xenon-arc lamps

1 Scope

This part of ISO 4892 specifies methods for exposing specimens to xenon-arc light in the presence of moisture to reproduce the weathering effects (temperature, humidity and/or wetting) that occur when materials are exposed in actual end-use environments to daylight or to daylight filtered through window glass.

Specimen preparation and evaluation of the results are covered in other International Standards for specific materials.

General guidance is given in ISO 4892-1.

NOTE Xenon-arc exposures of paints and varnishes are described in ISO 11341.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 4582, *Plastics — Determination of changes in colour and variations in properties after exposure to daylight under glass, natural weathering or laboratory light sources*

ISO 4892-1, *Plastics — Methods of exposure to laboratory light sources — Part 1: General guidance*

ISO 9370, *Plastics — Instrumental determination of radiant exposure in weathering tests — General guidance and basic test method*

3 Principle

3.1 A xenon arc, fitted with filters, is used to simulate the relative spectral irradiance of daylight in the ultraviolet (UV) and visible regions of the spectrum.

3.2 Specimens are exposed to various levels of light, heat, relative humidity and water (see 3.4) under controlled environmental conditions.

3.3 The exposure conditions are varied by selection of

a) the light filter(s);

b) the irradiance level;

c) the temperature during exposure to light;

d) the relative humidity in the chamber during light and dark exposures, when exposure conditions requiring control of humidity are used;

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e) the way the test specimens are wetted (see 3.4);

f) the water temperature and wetting cycle;

g) the relative lengths of the light and dark periods.

3.4 Wetting is produced by spraying the test specimens with demineralized/deionized water, by immersion in water or by condensation of water vapour onto the surfaces of the specimens.

3.5 The procedure includes measurements of the UV irradiance and UV radiant exposure in the plane of the specimens.

3.6 It is recommended that a similar material of known performance (a control) be exposed simultaneously with the test specimens to provide a standard for comparative purposes.

3.7 Intercomparison of results obtained from specimens exposed in different apparatus should not be made unless an appropriate statistical relationship has been established between the apparatuses for the particular material exposed.

4 Apparatus

4.1 Laboratory light source

4.1.1 General

The light source shall comprise one or more quartz-jacketed xenon-arc lamps which emit radiation from below 270 nm in the ultraviolet through the visible spectrum and into the infrared. In order to simulate daylight, filters shall be used to remove short-wavelength UV radiation (method A, see Table 1). Filters to minimize irradiance at wavelengths shorter than 310 nm shall be used to simulate daylight through window glass (method B, see Table 2). In addition, filters to remove infrared radiation may be used to prevent unrealistic heating of the test specimens, which can cause thermal degradation not experienced during outdoor exposures.

NOTE Solar spectral irradiance for a number of different atmospheric conditions is described in CIE Publication No. 85. The benchmark daylight used in this part of ISO 4892 is that defined in Table 4 in CIE No. 85:1989.

4.1.2 Spectral irradiance of xenon-arc lamps with daylight filters

Filters are used to filter xenon-arc emissions in order to simulate daylight (CIE Publication No. 85:1989, Table 4). The minimum and maximum levels of the relative spectral irradiance in the UV wavelength range are given in Table 1 (see also Annex A).

[A1] Annex C differentiates between two different types of daylight filters: Type I and Type II. Both types fall under the relative spectral irradiance requirements of xenon-arc lamps with daylight filters given in Table 1.[A1]

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